BIOMEDICAL ENGINEERING

OVERVIEW
Department website: https://www.uvm.edu/cms

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The University of Vermont (UVM) offers interdisciplinary graduate programs in Biomedical Engineering that leverage core strengths in engineering and collaborations with researchers across campus, including those in UVM’s Larner College of Medicine.

The M.S. in Biomedical Engineering gives students the opportunity to develop advanced engineering skills and domain expertise so that they may apply engineering methods to address problems related to human health. Students enrolled in the M.S. in BME program pursue a 2-year, personalized plan of study that includes only coursework, a project, or a research-oriented thesis. Students who complete their undergraduate studies at UVM may complete the M.S. in BME coursework in 1 year through an Accelerated Master’s Program (AMP).

The Ph.D. in Biomedical Engineering is a flexible, dynamic degree that trains aspiring researchers to apply engineering techniques to the study of biological systems. Research areas include bioinstrumentation, biomechanics, biomedical imaging, biomedical systems and signal analysis, clinical engineering, digital health, implant design, rehabilitation engineering, simulation and modeling, biomaterials, tissue engineering, and biomathematics.

DEGREES
Biomedical Engineering AMP
Biomedical Engineering M.S.
Biomedical Engineering Ph.D.

FACULTY
Bates, Jason H. T.; Professor, Department of Medicine-Pulmonary; DSC, Canterbury University; PHD, University of Otago
Berger, Christopher Lewis; Professor, Department of Molecular Physiology and Biophysics; PHD, University of Minnesota Twin Cities
Beynon, Bruce David; Professor, Department of Orthopaedics and Rehabilitation; PHD, University of Vermont
Cipolla, Marilyn Jo; Professor, Department of Neurological Sciences; PHD, University of Vermont
Doiron, Amber; Assistant Professor, Department of Electrical and Biomedical Engineering; PHD, University of Texas at Austin
Dubief, Yves C.; Associate Professor, Department of Mechanical Engineering; PHD, Institut National Polytechnique de Grenoble
Fiorentino, Niccolò M.; Assistant Professor, Department of Mechanical Engineering; PHD, University of Virginia
Floreni, Rachael Ann; Associate Professor, Department of Mechanical Engineering; PHD, Colorado State University
Jangraw, David; Assistant Professor, Department of Biomedical Engineering, PHD, Columbia University
McGinnis, Ryan S.; Assistant Professor, Department of Electrical and Biomedical Engineering; PHD, University of Michigan
Pandey, Amritanshu; Assistant Professor, Department of Electrical and Biomedical Engineering, PHD, Carnegie Mellon University
Rizzo, Donna Marie; Professor, Department of Civil and Environmental Engineering; PHD, University of Vermont
Spector, Peter Salem; Professor, Department of Medicine-Cardiology; MD, Albert Einstein College of Medicine
Warshaw, David; Professor, Department of Molecular Physiology and Biophysics; PHD, University of Vermont
Weiss, Daniel; Professor, Department of Medicine-Pulmonary; MD, PHD, Mount Sinai School of Medicine

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Courses
BME 5150. Nanobiomaterials. 3 Credits.
Covers the classes of nanomaterials used biomedically, the biological response, and material testing. Content includes applications of nanomaterials in drug delivery, nano-topography of surfaces, sensors, and imaging as well as the topic of nanotoxicity. Pre/Co-requisites: ME 2110, BME 3000, or equivalent with Instructor permission.

BME 5440. Biothermodynamics. 3 Credits.
Inter-disciplinary; guides the student through the thermodynamics of living organisms, comprised of the study of energy transformation in the life sciences. Designed for students from the STEM disciplines. Covers Gibbs free energy, statistical thermodynamics, binding equilibria, and reaction kinetics. Prerequisites: ME 2231, ME 2111, or BME 3600. Cross-listed with: ME 5440.

BME 5990. Special Topics. 1-18 Credits.
See Schedule of Courses for specific titles.

BME 6391. Master's Thesis Research. 1-18 Credits.
Research for the Master’s Thesis.

BME 6710. Brain-Computer Interfaces. 3 Credits.
Includes writing Python software to analyze data from the human brain and decode it to develop brain-computer interfaces (BCIs) that can predict a person's response/intent from brain activity alone. Includes work with real examples of neural data, particularly non-invasive electroencephalography (EEG) recordings. Discusses the design and ethics of real-world BCIs. Prerequisites: At least 2 semesters of coding, at least 1 of these semesters in Python or Matlab.

BME 6930. Brain-Computer Interfaces. 3 Credits.
Includes work with real examples of neural data, particularly non-invasive electroencephalography (EEG) recordings. Discusses the design and ethics of real-world BCIs. Prerequisites: At least 2 semesters of coding, at least 1 of these semesters in Python or Matlab.

BME 6990. Special Topics. 1-18 Credits.
See Schedule of Courses for specific titles.

BME 6993. Independent Study. 1-18 Credits.
A course which is tailored to fit the interests of a specific student, which occurs outside the traditional classroom/laboratory setting under the supervision of a faculty member, for which credit is awarded. Offered at department discretion.
BME 6995. Graduate Independent Research. 1-18 Credits.
Graduate student work on individual or small team research projects under the supervision of a faculty member, for which credit is awarded. Offered at department discretion.

BME 7491. Doctoral Dissertation Research. 1-18 Credits.
Research for the Doctoral Dissertation.

BME 7990. Special Topics. 1-18 Credits.
See Schedule of Courses for specific titles.

BME 7993. Independent Study. 1-18 Credits.
A course which is tailored to fit the interests of a specific student, which occurs outside the traditional classroom/laboratory setting under the supervision of a faculty member, for which credit is awarded. Offered at department discretion.

BME 7995. Graduate Independent Research. 1-18 Credits.
Graduate student work on individual or small team research projects under the supervision of a faculty member, for which credit is awarded. Offered at department discretion.